UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ARIZONA ECOLOGICAL SERVICES STATE OFFICE
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92-F-066
2-21-~~94-I-066~~

December 12, 1994

Mr. Bruce D. Eilerts
Department of the Air Force
56 CES/CEVN
14002 West Marauder Street
Luke Air Force Base, AZ 85309

Dear Mr. Eilerts:

This responds to your request of June 23, 1994 for consultation with the Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended, on the preferred alternatives for the widening and/or realignment of segments of four of the nine military training routes (MTRs) in Arizona. The species potentially affected by this action are the endangered bald eagle (*Haliaeetus leucocephalus*), American peregrine falcon (*Falco peregrinus anatum*), and the threatened Mexican spotted owl (*Strix occidentalis lucida*).

This biological opinion was prepared using information contained in the Draft Environmental Assessment for the Realignment and Widening of Military Training Routes: VR-231, VR-239, VR-245 and VR-1220 dated May 11, 1994 (Draft EA), other letters and documents exchanged between Luke Air Force Base (AFB) and the Service, discussions and field meetings with interested agencies, data in our files or in the published or grey literature, and other sources of information.

It is the Service's opinion that the widening and realignment of MTRs is not likely to jeopardize the continued existence of the endangered bald eagle, peregrine falcon, and threatened Mexican spotted owl.

BACKGROUND INFORMATION

Consultation History

The Service received a letter on June 23, 1994 requesting that the Service "review this action to determine if the proposed MTR proposal will adversely impact proposed and/or threatened and endangered species." That letter did not specify a "may effect" determination for any proposed or listed species, nor did it request concurrence with any specific determination. The Service responded on August 2, 1994 with comments on the Draft EA that would aid

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SUMMARY
BIOLOGICAL OPINION ON
PROPOSAL TO WIDEN AND/OR REALIGN SEGMENTS OF FOUR OF THE NINE MILITARY TRAINING ROUTES IN ARIZONA

Date of the opinion report: November 16, 1994

Action Agency: Department of the Air Force

Project: Realign and/or widen segments of four military training routes (MTRs) in Arizona.

Listed species, species proposed for listing, and critical habitats: The endangered bald eagle (*Haliaeetus leucocephalus*), American peregrine falcon (*Falco peregrinus anatum*), and the threatened Mexican spotted owl (*Strix occidentalis lucida*).

Biological opinion/conference report: Non-jeopardy for bald eagle, peregrine falcon, and Mexican spotted owl.

Reasonable and prudent alternative (RPA): N/A

Incidental take statement:

Level of take anticipated: Mortality of one bald eagle adult, immature, nestling, or egg, and two disturbance events at each active bald eagle breeding area traversed by MTRs. Mortality of one adult or immature peregrine falcon. Anticipated level of take is unknown for Mexican Spotted Owl.

Reasonable and prudent measures (RPMs) and terms and conditions: Implementation of the RPMs. Terms and conditions are mandatory requirements. Avoid bald eagle breeding areas during breeding season (Dec 1 - Jul 15) by re-routing aircraft one nautical mile laterally to either side of breeding area. Coordinate with and support Arizona Bald Eagle Nest Watch Program to evaluate the status and monitor bald eagle breeding areas. Avoid Mexican spotted owl nesting and roosting areas during breeding season (Feb 1 - Aug 31) by re-routing aircraft one nautical mile laterally to either side of spotted owl nesting and roosting areas. Coordinate with and support Forest Service efforts to evaluate distribution and breeding status of spotted owls within MTRs.

Conservation recommendations: Develop and support in cooperation with U.S. Fish and Wildlife Service, Arizona Game and Fish Department, U.S. Forest Service, Bureau of Land Management, National Biological Survey, and other affected State and Federal agencies a comprehensive research and research and monitoring plan that evaluates the impacts of MTR use on all Federal and State listed and candidate species occuring in Arizona.

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Luke AFB in evaluating the effects of the proposed action. The Service's August 2, 1994 response also clarified the process and responsibilities under section 7(a)(3) of the Act, reminding Luke AFB that the responsibility for determining whether a proposed agency action will affect any listed or proposed species, or adversely modify designated or proposed critical habitat, rests with the action agency. The Service's responsibility is to review the action agency's determination.

The Service learned on August 11, 1994 during a telephone conversation between Bruce Eilerts and Tom Gatz that the intent of the June 23, 1994 letter was to initiate section 7 consultation. During a subsequent conversation with Bruce Eilerts, Rob Marshall agreed to conduct the consultation based on the June 23, 1994 request date, and clarified the time frame in which the Service is obligated to complete the consultation. Based on the June 23, 1994 request date, the 90-day consultation period would end September 25, 1994. The Service has an additional 45 days to complete the biological opinion. Thus, the due date for the biological opinion is November 9, 1994.

The Service acknowledged in a letter dated August 30, 1994 the content of the previous telephone conversations and the request to initiate formal section 7 consultation. The Service also requested a 30-day extension to the consultation period due to the late date at which the Service learned of the request to initiate consultation. During a conference call on September 26, 1994 between Bruce Eilerts and members of his staff, and Tom Gatz, Tim Tibbitts, and Rob Marshall of my staff, Mr. Eilerts expressed concern that the consultation had not been completed. We reminded Mr. Eilerts that the 135-day period in which the Service has to complete the biological opinion was November 9, 1994.

Description of the Action

The action that is the subject of this biological opinion is the widening and/or realignment of segments of four MTRs in Arizona. MTRs are flight corridors, or defined areas of airspace that are used for the training of aircrews in low-altitude, terrain-following flight tactics. Military aircraft within MTRs fly as low as 30 meters (m) [100 feet (ft)] above ground level at speeds typically about 827 kilometers/hour (kmh) (517 miles/hour [mph]). The proposed actions are intended to: (1) establish flight corridors with sufficient width to permit realistic aircrew training; (2) consolidate three separate, but overlapping MTRs and form a single common corridor to decrease the potential for collisions between aircraft scheduled independently and to increase public safety; and (3) realign segments of one MTR to avoid a bald eagle nesting area. The specific actions entail the following.

Widen and Realign Visual Route 239 (VR-239) - VR-239 currently traverses 544 kilometers (km) (338 miles [mi]) of airspace and is composed of 8 segments up to 11 km (6.9 mi) in width. The route's northern terminus is at Lake Pleasant, from which it heads east crossing

the Mazatzal Wilderness, then southeast crossing the Salome Wilderness, Sierra Ancha Wilderness, Salt River Canyon Wilderness, and San Carlos Indian Reservation, then southwest crossing the San Carlos Reservoir, Tohono O'Odham Indian Reservation, and finally northwest across the Tohono O'Odham Reservation terminating on the Barry Goldwater Air Force Range.

The proposed, preferred alternative would widen seven of eight segments (A-G) and realign two segments (C-D and D-E) to the northeast. The total length of VR-239 would increase to 553 km (344 mi) and the maximum width of seven contiguous segments would increase to 18.5 km (11.5 mi).

Establish a Common Final Corridor for VR-231, VR-245, and VR-1220 - VR-231 currently traverses 200 km (124 mi) and is composed of three segments up to 18.5 km (11.5 mi) in width. The route's southern terminus lies in the north-central portion of the Barry Goldwater Range, from which it heads northwest crossing the Eagletail Mountains Wilderness, then east from Harcuvar crossing the Big Horn Mountain Wilderness and Hummingbird Springs Wilderness, then terminating at the eastern end of Harquahala Plains.

VR-245 currently traverses 414.3 km (257.5 mi) and is composed of five segments up to 7.4 km (4.6 mi) in width. The route's southern terminus also lies within the north-central portion of the Barry Goldwater Range, from which it heads northwest across the Palomas Plain to Harcuvar, then north across Butler Valley and the Rawhide Mountains Wilderness, then northeast across Alamo Lake and the Tres Alamos Wilderness to Kirkland Junction, then southeast across the Hassayampa River Canyon Wilderness and Hells Canyon Wilderness terminating at the north end of Lake Pleasant.

VR-1220 currently traverses 510.2 km (317 mi) and is composed of eight segments up to 18.5 km (11.5 mi) in width. The route's southern terminus also lies within the north-central portion of the Barry Goldwater Range, from which it heads north across Hyder Valley turning northwest at the Gila Bend Mountains crossing the Eagletail Mountains Wilderness, then turning north at Vicksburg crossing Butler Valley, East Cactus Plain Wilderness, Swansea Wilderness, Aubrey Peak Wilderness, and Wabayuma Peak Wilderness, then turning east-southeast at Hualapai Mountain County Park crossing the Aquarius mountains and turning south-southeast at the Luis Maria Baca Grant, then east near the town of Date Creek, then south-southwest at Crown King crossing the Hassayampa River Canyon Wilderness and Hells Canyon Wilderness.

Description of the Project Area

The boundaries of the MTRs for the proposed action encompass approximately 89,000 km^2 (30,000 mi^2) of lands in Arizona extending north to Kingman, east to the San Carlos Indian

Reservation, south to the Tohono O'Odham Indian Reservation, and west to Vicksburg. The existing and proposed MTRs cross most of the major vegetation communities in Arizona, including Mohave desertscrub, Sonoran desertscrub, interior chaparral, pinyon-juniper woodlands, plains and desert grassland and montane conifer forest. Within the major vegetation communities are a diversity of habitats important to many wildlife species, including endangered, threatened, and candidate species. Proposed and existing MTRs cross and or follow many drainages (e.g., Salt River Canyon), which contain significant riparian and aquatic habitats that attract a disproportionate number of species and individuals compared to adjacent, non-riparian habitats. The Draft EA identifies 490 vertebrate species that occur within the proposed action area, including 20 fish, 14 amphibians, 65 reptiles, 301 birds, and 90 mammals. Sixty of these are special status species, those that are listed, proposed, or candidates for listing by the Federal government and/or the Arizona Game and Fish Department (AGFD).

Species Descriptions

Bald Eagle

The bald eagle was listed as an endangered species on March 11, 1967 (32 FR 4001). No critical habitat has been designated for this species. The bald eagle was once found throughout North America, nesting in trees or on cliffs near seacoasts, lakes and rivers. The primary food is fish, taken live or as carrion. Chemical contamination, chiefly by organochlorine pesticides, caused severe population declines and local extirpation throughout the species' range through reproductive failure and direct toxicity.

Although not considered a separate subspecies, bald eagles in the southwestern United States are considered a distinct population for purposes of recovery efforts and section 7 consultations under the Act (USFWS 1982, 1986). Southwestern bald eagles constitute a distinct population, distinguishable by morphology, breeding chronology and geographic isolation. Southwestern bald eagles are also distinct behaviorally, frequently nesting on cliffs, a phenomenon uncommon or absent outside this geographic region. The southwestern bald eagle nests early, with eggs laid in January or February. This is believed to be a behavioral adaptation to avoid the extreme desert heat of midsummer. The young eagles remain in the vicinity of the nest until June (Hunt *et al.* 1992). This population also supplements its piscine diet with mammals, bird, and reptiles, taken either live or as carrion (Heywood and Ohmart 1986, Hunt *et al.* 1992). Approximately 36 bald eagle breeding areas (BAs), each supporting one nesting pair, have been identified in the southwestern population in recent years. The majority of the population inhabits Arizona, distributed along the Salt, Verde, Gila, Agua Fria and Bill Williams Rivers, and several major tributaries. Two are known in New Mexico (pers. comm., Sartor O. Williams III, New Mexico Department of Game and Fish), and 34 in Arizona (Hunt *et al.* 1992, G. Beatty, pers. comm., AGFD).

Of the 34 BAs identified in Arizona, 28 were occupied in 1994. Of the 27 eggs hatched, 18 young were fledged. The alignment of VR-239 currently crosses three occupied BAs. The preferred alternative will cross eight BAs, seven of which were occupied in 1994. The alignment of VR-245 currently crosses 3 BAs. The preferred alternative for VR-245 will cross one BA.

American Peregrine Falcon

The peregrine falcon was listed as an endangered species on October 13, 1970 (35 FR 16047). No critical habitat has been designated for this species. The peregrine is a medium-sized raptor with various subspecies distributed worldwide. The American peregrine falcon occurs across much of North America. It nests on cliffs near sources of avian prey. The peregrine has traditionally been associated with cliffs near large bodies of water such as seacoasts, lakes and large rivers (Ratcliffe 1980). However, the arid American southwest has recently been demonstrated to support the largest concentration of breeding peregrines known in North America, excluding Alaska. Studies have documented high densities of breeding pairs in the Southwest, particularly the Colorado Plateau (Burnham and Enderson 1987, Hays and Tibbitts 1987, Tibbitts and Bibles 1990, Brown 1991). Local concentrations of nesting pairs have also been documented in the mountains of southeastern Arizona (Tibbitts and Ward 1990a and 1990b, Berner and Mannan 1992, Ward 1993).

In the Southwest, breeding peregrines are currently found almost anywhere large (approximately $\geq$100 m) cliffs are available, with the exception of the hottest and driest desert regions (Tibbitts and Ward 1990a, Ward 1993, USDI unpubl. data). Large cliffs overlooking chaparral, pinyon-juniper woodland, conifer forest, and riparian habitats apparently provide high-quality habitat. These cliffs are currently occupied by breeding pairs almost wherever they occur in Arizona and southern Utah, even where surface water may be many miles distant. Even in the Sonoran desert, peregrine falcons may be found breeding where perennial surface water and associated riparian prey populations are available.

Mexican Spotted Owl

The Mexican spotted owl was listed as threatened on March 16, 1993 (58 FR 14248). Critical habitat has not yet been proposed for the owl. The State of Arizona lists the owl as threatened (AGFD 1988). The owl is a medium-sized raptor found from central Colorado and Utah south through Arizona, New Mexico, western Texas, then south through northwestern Mexico. The spotted owl inhabits dense forests with old-growth characteristics such as high canopy closure, multilayered canopy, uneven age stands, downed logs, snags, mistletoe, and other features indicative of the absence of management. Much of spotted owl habitat is characterized by steep slopes, rocky cliffs, and canyons. Spotted owls inhabit forested habitats between 1220 to 2740 m (approx. 4,000 to 9,000 ft.) comprised of mixed

conifer, pine-oak, ponderosa pine, or evergreen oak woodlands. Mexican spotted owls prey on mammals, birds, reptiles, and insects with mammals making up the bulk of the diet. Spotted owls are known to nest in the Mazatzal Mountains, which are traversed by VR-239.

ENVIRONMENTAL BASELINE

The environmental baseline defines the current status of the proposed species and its habitat to provide a basis for assessing the effects of the action now under consultation. While it is clearly focused on conditions in the action area, it is important to include in this definition the status of the listed species throughout its range as well as in the action area. Any evaluation of the effects of the action must be made in the context of the overall species' status.

The environmental baseline is developed using past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process. A summary of status information for the species from outside the action area also forms a part of the environmental baseline.

Past Actions

The action area, which encompasses approximately 89,000 km^2 (30,000 mi^2), is subject to the effects of numerous Federal, State, and private actions. There are both new and long-term ongoing actions in the action area. Impacts of these human activities have had profound effects on the landscape traversed by MTRs, which in turn have affected the population status (both positively and negatively) of native fauna and flora. Modification and fragmentation of habitats by urban and rural expansion, transportation corridors, recreation pressures, etc. have and continue to eliminate, reduce in size, and/or isolate habitats occupied by Arizona's native organisms. Water development projects have reduced or eliminated habitats in some circumstances (e.g., diversions), and replaced one habitat type with another in others (e.g., reservoirs). Habitat loss translates to less space for fauna and flora and a decrease in the carrying capacity of the landscape. This decrease can result from changes in trophic relationships (e.g., loss of prey populations), changes in habitat quality (e.g., expansion of exotic organisms), inter-specific competition, or other density-dependent factors (e.g., disease). Fragmentation reduces the size, shape, and continuity of habitats, which changes ecological relationships such as predation rates and species composition and abundance. Fragmentation can also impede the flow of genetic material within and between populations. Human activities have resulted in intentional and unintentional introductions of exotic species, which, in some cases, have dramatically altered ecological relationships across Arizona (e.g., tamarisk, non-native fish species).

While these processes are natural within a geological time frame, the rate at which they are currently occurring (within a human life or shorter) is unprecedented and highly unnatural (i.e., the affected organisms are experiencing evolutionary challenges at an unprecedented rate). The ultimate effect of continual, long-term activities that eliminate, modify, or degrade the environment is the elimination of biological diversity. Native organisms that comprise the biodiversity of an ecosystem play important, often unrecognized roles in ecosystems, including: (1) photosynthesis, oxygen replenishment and uptake of carbon dioxide; (2) nutrient uptake and nutrient cycling (e.g., decomposition/filtration of wastes, water/air purification); (3) forage or prey for maintenance and expansion of food webs and trophic levels, and; (4) pollination and seed dispersal. Along with these basic ecosystem services and functions, native organisms also provide for a variety of recreational opportunities.

Ecosystem resilience is the capability of a system to regain control over biomass accumulation, nutrient cycles, and trophic relationships after a perturbation (Borman and Likens 1987). When ecosystem resiliency is diminished, the threshold for perturbations that disable the system from regaining control over basic processes is lowered. Activities that diminish biodiversity diminish resiliency. Diminished ecosystems provide fewer benefits to humans (e.g., clean water, nutrient cycling, abundant wildlife).

Bald Eagle

The southwestern bald eagle population is exposed to increasing hazards from a regionally increasing human population. These include extensive loss and modification of riparian breeding and foraging habitat through clearing, changes in groundwater levels and the natural hydrograph, and changes in water quality. Hazards also include increasing human disturbance from urban and rural encroachment and recreation (e.g., collisions with vehicles, aircraft, transmission lines and structures, poisoning, electrocution, shooting; Stahlmaster 1987). The bald eagle population in the Southwest was probably never very large due to limited habitat, and in pre-industrial times likely fluctuated in size in response to weather conditions (e.g., cyclic droughts and wet periods). Following the banning of domestic use of the pesticide DDT in 1972, the Arizona bald eagle population has increased. However, while significant recovery has taken place, the bald eagle remains somewhat tenuously established in the Southwest. Approximately 20 historic site records strongly suggest the historic presence of bald eagle nest sites that have not been occupied during the last decade (Hunt *et al.* 1992). These observations suggest factors are at work that are currently limiting further recovery or population expansion. These factors may compound the stresses of a naturally harsh environment for breeding bald eagles. Particularly near population centers, eagle breeding sites face continually increasing threats from malicious and accidental harassment, including shooting, off-road vehicles (ORVs), low aircraft overflights, loss of nesting and foraging habitat from riparian degradation, and lethal entanglement in fishline (Hunt *et al.* 1992).

Much of the southwestern bald eagle population is exposed to the pressures described above. Half of Arizona's 34 known breeding sites are located on rivers and near reservoirs that are easily and frequently accessed by the public, providing the potential for these threats. The Arizona Bald Eagle Nest Watch Program (ABENWP) continues to document disturbance at nest sites and frequently intervenes to reduce harassment. This intervention has proven not only effective, but perhaps crucial in maintaining the southwestern population. Up to 50% of a given year's reproduction has been salvaged by ABENWP "rescue" operations. These include removing fishline and tackle from nestlings and returning nestlings to nests after they fell or jumped out in response to disturbance, or to escape extreme heat. Protection of breeding and feeding areas is crucial to maintaining the growth the population has experienced since 1972. Riparian wetland and other wetland habitats must be maintained or enhanced for this species to continue to move toward recovery.

Peregrine Falcon

The American peregrine falcon appears to be making considerable progress toward recovery throughout much of its range. Recovery appears to be greatest in the Colorado Plateau of southern Utah, southwest Colorado and northern Arizona, and in adjacent habitats in Arizona, Utah and Colorado. Recovery in this region is inferred from high total numbers of breeding pairs, high rates of site occupancy and high reproductive success (Burnham and Enderson 1987, Enderson *et al.* 1991, Tibbitts and Bibles 1990, Tibbitts and Ward 1990a and 1990b, Ward 1993).

Mexican Spotted Owl

Background and status information on the Mexican spotted owl have been described in the Final Rule listing the Mexican spotted owl as a threatened species (58 FR 14248; March 15, 1993). The total estimated population of Mexican spotted owl in the southwestern U.S. is 2,160 owls (USFWS 1993a). Current, known spotted owls for the southwestern United States and Mexico total 312 pairs and 226 singles (850 birds) (USFWS 1993a). There are no estimates of historic population size, although current and historic range are thought to be similar. Current spotted owl records for New Mexico total 129 pairs and 85 single birds (USFWS 1993a).

Potential spotted owl habitat in the Southwest as reported by Federal and State agencies in 1990 is shown in Table 1 by land management.

Table 1. Mexican spotted owl habitat estimated by Federal and State agencies (USFWS 1993a, 1993b, 1994).

Land Management	Acres Habitat
National Forest	2,869,000
Bureau of Land Management	711,000
National Park Service	238,000 - 437,600
New Mexico State Lands	177,400 - 202,400
BIA	878,000
Total:	5,126,400 - 5,351,000

Consultation requirements for the MSO under section 7 of the Act for all Federal projects began April 14, 1993, when the owl was listed as a threatened species. Since that date, the Forest Service (USFS) and Bureau of Indian Affairs are the only Federal agencies in New Mexico and Arizona that have requested formal consultation for the spotted owl and received a biological opinion. The consultation process has revealed that since the owl was listed, approximately 6,395 acres of suitable habitat on Federal land administered by the USFS in Arizona and New Mexico has been converted to capable habitat. With that conversion, it has been estimated that incidental take of 36 owls has occurred.

EFFECTS OF THE ACTION

Direct and Indirect Effects

Studies that have investigated the effects of low-level aircraft overflights on birds have determined that such flights disturb raptors (Manci *et al.* 1987). Disturbances include interrupting nesting activities by flushing birds from nests and roosts, displacing birds returning to nests, flushing or displacing birds from foraging areas, provoking interactions with sympatric raptors, and exposing eggs and nestlings to predators and extreme heat. Studies have also suggested that human activities within breeding and nesting territories may affect raptors by changing home range movements (Anderson *et al.* 1990) and causing nest abandonment (Postovit and Postovit 1987, Porter *et al.* 1973). While these studies have not demonstrated a causal link between low-level overflights and reproductive success, they do document a level of disturbance that clearly is equivalent to harassment. Under section 9(a)(1)(B) of the Act, harassment is a form of take.

Bald eagles are particularly susceptible to disturbance both on breeding and wintering grounds (Manci *et al.* 1987, Lamp 1989, Ehrlich *et al.* 1992). Observations obtained by nest

watchers for ABENWP have documented numerous instances where low-level jet aircraft using MTRs have startled nesting bald eagles and chicks, and passed within close proximity (both above and below) to eagles flying around nesting and foraging areas. The elevation and lateral distance at which low-level flights occur near bald eagle nesting areas is of particular concern because eagles regularly fly to 610 m (2,000 ft) above the surrounding landscape. This puts eagles at risk of collision with low-flying aircraft travelling at speeds that do not enable pilots to avoid bird strikes. The Draft EA documents 62 bird strikes on six MTRs for the period 1990-1993, but gives no data on the species affected. The potential for collisions with eagles also puts pilots and aircraft at considerable risk.

The current alignment of VR-239 traverses three BAs (Pleasant, Horseshoe, and 76) and the preferred alternative will cross eight (Pleasant, Horseshoe, 76, Canyon, Cibecue, Mulehoof, Ash, and Coolidge), seven of which were active in 1994. The alignment of VR-245 currently crosses three BAs (Pleasant, Ive's Wash, Alamo). The preferred alternative for VR-245 will cross one BA (Pleasant). The degree to which the widening of VR-239, and thus the potential for aircraft to be re-routed away from BAs, will offset the substantial increase in the number of BAs traversed was not discussed in the Draft EA. If aircraft are re-routed during the breeding season (December 1 to July 15) to avoid active BAs, potential disturbance to or take of eagles can be avoided altogther.

Peregrine falcons are widely distributed within the project area and are subject to the same disturbances as the bald eagle. The degree of disturbance that peregrine falcons can tolerate is generally believed to be a function of the magnitude of the disturbance, distance from the breeding site, and the falcon's habituation to human activities. Raptors in frequent contact with human activities tend to be less sensitive to additional disturbances than raptors nesting in remote areas. However, exposure to direct human persecution may make raptors more sensitive to disturbances (Newton 1979). Where prey is abundant, raptors may even occupy areas of high human activity, such as cities and airports (Newton 1979, Ratcliffe 1980, White *et al.* 1988). The timing, frequency, and predictability of the disturbance may also be factors. Some raptors exposed to human disturbance become less sensitive as the nesting cycle progresses (Newton 1979). Generally, peregrine falcons are least tolerant of disturbance during the prelaying and incubation periods. After young are hatched, peregrines exhibit considerably higher levels of tolerance and are unlikely to abandon the nesting attempt (Cade 1960, Cade and White 1976, Fyfe and Olendorff 1976, Eberhardt and Skaggs 1977, Olsen and Olsen 1978, Monk 1980, Roseneau *et al.* 1981).

Holthuijzen *et al.* (1990) evaluated nesting prairie falcon responses to construction activities from 1983 to 1986 at Swan Falls Dam, Idaho. He compared sites near construction and recreation activity to controls (sites without disturbance). Construction activity included drilling and blasting to rebuild an unpaved road 60 to 300 m from active nests and continued throughout the nesting season. Each nest in the blasting study location was exposed to three blasts a day [138-146 decibels (Db)], at three-hour intervals on a rock surface facing the nest at an average distance of 127 m. This blasting sequence was repeated every other day until

the young were 35 days old. When present, falcons reacted to blasting 137 of 254 times (54%). Incubating and brooding falcons were flushed in 25 of 112 instances (22%) but returned to their nests within an average of 3.4 minutes. No eggs were dislodged when the falcons flushed.

Based on comparisons of behavior, nestling weight, occupancy, and productivity between the test and control sites, the authors concluded that "In general, this study demonstrated that construction and recreation activities had no detectable adverse effects on nesting prairie falcons." Based on these findings, they recommended that "... blasting associated with limited human activities does not need to be restricted at distances greater than 125 m (410 ft) from occupied prairie falcon aeries (nests), provided that peak noise levels do not exceed 140 Db at the aerie and no more than three blasts occur on a given day or 90 blasts during the nesting season."

Holthuijzen (1989) suggested that taxonomic relatedness and similarities in behavior and reaction to human disturbance among prairie falcons, peregrines, and gyrfalcons may allow application of similar management recommendations among species. However, varying adaptation to various activity levels is widely recognized among raptor species and individual birds. In Alaska, peregrine falcons deserted nests near blasting associated with construction of a natural gas transportation system (USDI, Bureau of Reclamation 1976). These birds seemed to habituate to other activities of construction but not blasting. Ellis (1981) also found that large explosions can cause hatch failure. Peregrine falcons have also been observed to flush repeatedly in response to 105 Db machinery noise at 400 to 900 m from nest sites and respond visually to 105 Db noises 1600 to 3400 m from the nest (Johnson 1988).

In areas of "topographic screening," Johnson (1988) suggests that human activity within a core area of about 1,300 feet of the nest might impact peregrine breeding efforts. His recommended core area increased to 2,950 feet in areas with no topographic screening. He based these distances on a model using thresholds for flight responses, not on verified impacts on productivity. Construction activities, operation of heavy machinery, and aircraft activity, all with the notable absence of direct human persecution, were generally tolerated by nesting peregrine falcons and gyrfalcons (Platt 1977, Ellis 1981, Haugh 1982, White and Thurow 1985, Ritchie 1987, White *et al.* 1988). Peregrines have nested in situations where there is a high level of disturbance, such as on buildings in urban settings. They have also nested near potential disturbance from low level military jets and sonic booms (Ellis 1981). Peregrine falcons and golden eagles have been known to nest successfully within a few hundred meters of areas such as airports, blasting, construction, quarrying, and mining sites (Pruett-Jones *et al.* 1980, Haugh 1982, White and Thurow 1985, White *et al.* 1988). Apparently, responses vary considerably within and among species.

No survey data is provided to evaluate the current use of the Mazatzal Mountains by the Mexican spotted owl. Although the spotted owl is primarily nocturnal, low-level flights have the potential to startle roosting and incubating birds. Displacing spotted owls from nests and roosting areas leaves eggs, nestlings, and adults vulnerable to diurnal predators.

Cumulative Effects

Cumulative effects are those effects of future State, local government, or private activities that have no Federal connection, that are reasonably certain to occur within the action area of the Federal action subject to consultation. Future Federal actions are subject to the consultation requirements established in section 7 of the Act, and, therefore, are not considered cumulative in the proposed action. It is anticipated that the ongoing private actions described in the environmental baseline will continue in the action area.

INCIDENTAL TAKE

Section 9 of the Act, as amended, prohibits the taking (harass, harm, pursue, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species without a special exemption. The concept of harm includes significant habitat modification and degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding or sheltering. Case law has affirmed that taking does harm to listed species when there is definable injury or death to individuals. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of the agency action, is not considered taking within the bounds of the Act, provided such taking is in compliance with the incidental take statement provided in the biological opinion. The measures described below are nondiscretionary, and must be undertaken by the agency or made a binding condition of any grant or permit issued to the applicant, as appropriate.

Bald Eagle

In considering the proposed project now under consultation, incidental take is broadly defined as either the direct mortality of individual adults, immature birds, nestlings, and eggs as a result of aircraft use of MTRs, or disturbance to birds that results in the interruption of breeding or foraging activities, including: territory establishment and maintenance, courtship behavior, nest-building, egg-laying, incubation, roosting near nest sites, foraging, feeding young, defending young against predators, and fledging young. Disturbance is defined as the flushing or displacing of eagles engaged in one of the above activities. Continued disturbance beyond that provided for under incidental take is considered harassment, which

under the Act is "take." Incidental take is set at the direct mortality of one adult or immature bald eagle, bald eagle nestling, or the loss of one bald eagle egg, or two instances of disturbance (as described above) per active nest per nesting season (December 1 to dispersal of young). This level of disturbance to each active BA will permit Luke AFB to coordinate with AGFD as to the location and status of active BAs so that active BAs can be avoided.

If during the proposed action more than one adult bald eagle, immature bald eagle, nestling, or egg, is killed as a result of aircraft use of MTRs, or disturbance to active BAs exceeds two events, Luke AFB must reinitiate consultation with the Service immediately to avoid violation of section 9 of the Act. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i).

Peregrine Falcon

Currently, there is no program equivalent to ABENWP that monitors the nesting activities of peregrines. Their wide distribution and abundance in Arizona would make a comprehensive effort infeasible. Disturbance cannot be monitored and used as a measure of take. Incidental take is set at one adult or juvenile peregrine mortality that results from a collision with aircraft use of MTRs.

Mexican Spotted Owl

No data was provided on the potential for direct or indirect take of spotted owls. The anticipated level of take is unknown.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to avoid take of the bald eagle.

1. Avoid active bald eagle breeding areas during the breeding season (December 1 to dispersal of young [July 15]) by re-routing aircraft on MTRs one nautical mile (1852 m; 6074.5 ft) laterally to either side of each active BA.

2. Provide funding to the ABENWP annually for the duration of use of MTRs or until the southwestern bald eagle is delisted to ensure

BAs are evaluated for breeding status and that active BAs within MTRs are monitored and evaluated for compliance with incidental take levels specified. Minimum funding should cover ABENWP costs for monitoring and evaluating active BAs within MTRs.

3. Avoid active Mexican spotted owl nesting and roosting areas during the breeding season (Feb 1 - Aug 31) by re-routing aircraft on MTRs one nautical mile laterally to either side of each nesting/roosting area. When the exact location of the nesting area is unknown, re-route aircraft on MTRs one nautical mile laterally to either side of the spotted owl "management territory." If the MTRs fly over previously unsurveyed suitable habitat, or over areas for which surveys are outdated, conduct or financially support Forest Service and/or AGFD survey efforts to determine the presence/absence of spotted owls. Conduct or financially support Forest Service and/or AGFD efforts to monitor compliance with reasonable and prudent measures.

Terms and Conditions for Implementation

In order to be exempt from the prohibitions of section 9 of the Act, Luke AFB is responsible for compliance with the following terms and conditions, which implement the reasonable and prudent measures described above.

1. The following terms and conditions will implement reasonable and prudent measures 1 and 2. Coordinate with and financially support ABENWP annually to determine the status and location of active BAs. Minimum funding should cover ABENWP costs for monitoring and evaluating active BAs within MTRs.

2. The following terms and conditions will implement reasonable and prudent measure 3. Coordinate with the Tonto National Forest and AGFD to determine extent of surveys in affected areas, where additional surveys need to be conducted, and for locational information on the distribution and breeding status of spotted owls within MTRs. Financially support Forest Service and/or AGFD survey and monitoring efforts. Minimum funding should cover Forest Service and/or AGFD costs for monitoring and evaluating spotted owl use within MTRs and effects of overflights.

Reporting Requirements

Upon locating a dead, injured, or sick endangered or threatened species specimen, initial notification must be made to the Service's Law Enforcement Office in Mesa, Arizona. Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible stat for later analysis of cause of death. In conjunction with the care of sick or injured endangered species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" has been defined as Service suggestions regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibility for the species.

The Service recommends the following actions:

1. Develop and support in cooperation with the Service, AGFD, USFS, Bureau of Land Management, National Biological Survey, and other affected State and Federal agencies a comprehensive research and research and monitoring plan that evaluates the impacts of MTR use on all Federal and State listed and candidate species occuring in Arizona.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects of that benefit listed species, species proposed for listing, or their habitats, the Service requests notification of the implementation of any conservation recommendations.

CONCLUSION

This concludes formal consultation on the actions outlined in the Draft Environmental Assessment for the Realignment and Widening of Military Training Routes: VR-231, VR-239, VR-245 and VR-1220. As required by 50 CFR 402.16, reinitiation of formal conferencing is required if: (1) the amount or extent of incidental take is reached; (2) new information reveals effects of the agency action that may impact listed species or critical

habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

If we can be of further assistance, please contact Rob Marshall or Tom Gatz.

Sincerely,

Sam F. Spiller
State Supervisor

cc: Regional Director, U.S. Fish and Wildlife Service, Albuquerque, New Mexico
Director, Arizona Game and Fish Department, Phoenix, Arizona
Forest Supervisor, Tonto National Forest, Phoenix, Arizona

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